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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/618,715	07/15/2003	Yoichi Momose	116220	7427

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EXAMINER	
DI GRAZIO, JEANNE A	

ART UNIT	PAPER NUMBER
2871	

DATE MAILED: 05/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/618,715	MOMOSE, YOICHI	
	Examiner	Art Unit	
	Jeanne A. Di Grazio	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 March 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 July 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *Feb. 3, 2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claims

Claims 1-14 are pending. Claims 1-6 and 9 are amended per Response of March 3, 2005. Claims 10-14 are newly added per Response of March 3, 2005.

Priority

Priority to Japanese Patent Applications 2002-212765 (July 22, 2002) and 2003-114360 (April 18, 2003) is claimed.

Claim Objections

Claims 12 and 13 are objected to because of the following informalities:

As to both claims 12 and 13, the preambles of both claims recite a device. However, the claims from which claims 12 and 13 depend (claims 1 and 2 respectively) are drawn to methods.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

JDG Claims 1-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent 6,337,729 B1 (to Mori) in view of United States Patent 4,341,445 (to Matsuyama et al.) and further in view of United States Patent Application 2001/0005255 A1 (to Niiya et al.)(filed: Dec. 21, 2000).

As to claim 1 (amended), Mori teaches and discloses with reference to Figure 1, a liquid crystal display device having a pair of substrates (3 and 4) *including an upper (4) and a lower (3) substrate*, spacers (18) located between the substrates (3 and 4), and a liquid crystal layer (17) held between the substrates (3 and 4), the liquid crystal layer (17) and spacers (18) being located in a region surrounded by a frame-shaped seal material (16). The seal material (16) surrounds the display region and the seal material (16) has no opening for an injection port. Therefore, the liquid crystal material may be dropped onto a lower substrate as consistent with the Mori invention.

Mori does not appear to explicitly specify *the spacers being fixedly adhered to the lower substrate*.

Matsuyama teaches and discloses a liquid crystal display element and production method wherein a plurality of spacers (Figure 6, spacers 7a) are adhered on an orientation controlling film (12) on an electrode (3) substrate (1) and then dried and baked to attach the spacers (7a)

onto the film (12) and overall substrate (1) (Abstract and entire patent). The purpose of affixing the spacers onto a substrate is to prevent deviation in the electrode substrates and to promote a uniform cell gap (entire patent). Please note that the spacers may be adhered to either or both substrates (Column 5, Lines 36-46).

Therefore, it would have been obvious to one of ordinary skill in the art of liquid crystals at the time the invention was made to modify Mori in view of Matsuyama to prevent deviation of the substrates in the completed device and to ensure a uniform cell gap.

Mori furthermore teaches and discloses a spacer distribution density ranging from 100 to 600 particles per square millimeter (Column 6, Lines 34-56). Such a range overlaps with Applicant's claimed range of 100 to 300 mm^2. Mori teaches that if the spacer distribution density is smaller than 100 particles per square millimeter, liquid crystal layer thickness cannot be made uniform (Id.). Mori also teaches that if the density exceeds 600 particles per square millimeter, too much light would pass through the spacers thus resulting in display roughness (Id.).

Therefore, it would have been obvious to one of ordinary skill in the art of liquid crystals at the time the invention was made to optimize a range of spacer distribution density to (1) ensure uniformity of the liquid crystal layer thickness and (2) to prevent display roughness both (1 and 2) as taught and disclosed by Mori.

Mori does not appear to explicitly specify an average particle size "D" of the spacers ranging from 0.96d to 1.02d, where a liquid crystal layer thickness in the region in which the spacers are disposed is represented by "d."

Niiya, on the other hand, teaches a liquid crystal display element and manufacturing method and teaches a range of (average) spacer thickness (x) with respect to cell gap thickness

(d) of $d<x\leq 1.1d$ (entire patent). This range contributes to suppression of color shading while suppressing generation of bubbles in a vacuum region and prevents reduction in contrast (abstract, entire patent).

It would have been obvious to one of ordinary skill in the art of liquid crystals at the time the invention was made to modify Mori in view of Niiya to optimize upon spacer thickness with respect to substrate (liquid crystal) thickness for the suppression of color shading while suppressing generation of bubbles in a vacuum region and for the prevention of a reduction in contrast (abstract, entire patent).

As to claim 2 (amended), Mori teaches and discloses with reference to Figure 1, a liquid crystal display device having a pair of substrates (3 and 4) *including an upper (4) and a lower (3) substrate*, spacers (18) located between the substrates (3 and 4), and a liquid crystal layer (17) held between the substrates (3 and 4), the liquid crystal layer (17) and spacers (18) being located in a region surrounded by a frame-shaped seal material (16). The seal material (16) surrounds the display region and the seal material (16) has no opening for an injection port. Therefore, the liquid crystal material may be dropped onto a lower substrate as consistent with the Mori invention.

Mori does not appear to explicitly specify *the spacers being fixedly adhered to the lower substrate*.

Matsuyama teaches and discloses a liquid crystal display element and production method wherein a plurality of spacers (Figure 6, spacers 7a) are adhered on an orientation controlling film (12) on an electrode (3) substrate (1) and then dried and baked to attach the spacers (7a) onto the film (12) and overall substrate (1) (Abstract and entire patent). The purpose of affixing

the spacers onto a substrate is to prevent deviation in the electrode substrates and to promote a uniform cell gap (entire patent). Please note that the spacers may be adhered to either or both substrates (Column 5, Lines 36-46).

Therefore, it would have been obvious to one of ordinary skill in the art of liquid crystals at the time the invention was made to modify Mori in view of Matsuyama to prevent deviation of the substrates in the completed device and to ensure a uniform cell gap.

Mori furthermore teaches and discloses a spacer distribution density ranging from 100 to 600 particles per square millimeter (Column 6, Lines 34-56). Such a range overlaps with Applicant's claimed range of 150 to 300 mm^2. Mori teaches that if the spacer distribution density is smaller than 100 particles per square millimeter, liquid crystal layer thickness cannot be made uniform (Id.). Mori also teaches that if the density exceeds 600 particles per square millimeter, too much light would pass through the spacers thus resulting in display roughness (Id.).

Therefore, it would have been obvious to one of ordinary skill in the art of liquid crystals at the time the invention was made to optimize a range of spacer distribution density to (1) ensure uniformity of the liquid crystal layer thickness and (2) to prevent display roughness both (1 and 2) as taught and disclosed by Mori.

Mori does not appear to explicitly specify an average particle size "D" of the spacers ranging from 0.96d to 1.02d, where a liquid crystal layer thickness in the region in which the spacers are disposed is represented by "d."

Niiya, on the other hand, teaches a liquid crystal display element and manufacturing method and teaches a range of (average) spacer thickness (x) with respect to cell gap thickness (d) of $d<x\leq 1.1d$ (entire patent). This range contributes to suppression of color shading while

suppressing generation of bubbles in a vacuum region and prevents reduction in contrast (abstract, entire patent).

It would have been obvious to one of ordinary skill in the art of liquid crystals at the time the invention was made to modify Mori in view of Niiya to optimize upon spacer thickness with respect to substrate (liquid crystal) thickness for the suppression of color shading while suppressing generation of bubbles in a vacuum region and for the prevention of a reduction in contrast (abstract, entire patent).

As to claim 3 (amended), as noted, the seal material (16) surrounds the display region and the seal material (16) has no opening for an injection port.

As to claim 4 (amended), Matsuyama teaches and discloses that the spacers are coated within an orientation controlling film (sticking layer) and then dried and baked for firm attachment to either or both of the substrates (Column 5, Lines 36-46).

As to method claims 5-8 (claims 5-6 both amended claims) and 12-13 (both new), the method of manufacturing the liquid crystal display device would have been obvious to one of ordinary skill in the art of liquid crystals at the time the invention was made in view of the structures and devices as taught and disclosed by Mori in view of the above noted references.

As to claim 9 (amended), Mori teaches and disclose that the device is applicable to electronic equipment (See, e.g., Mori Description of the Background Art).

As to claims 10 and 11 (both new), please note that Niiya teaches a cell spacing of about 6μm (Examples and entire patent).

As to claim 14 (new), Mori teaches and discloses with reference to Figure 1, a liquid crystal display device having an upper substrate (4), a lower substrate (3), spacers (18) located between the substrates (3 and 4), and a liquid crystal layer (17) held between the substrates (3 and 4), the liquid crystal layer (and spacers) held between the substrates (3 and 4) in a region surrounded by the frame-shaped seal material (16). The seal material (16) surrounds the display region and the seal material (16) has no opening for an injection port. Therefore, the liquid crystal material may be dropped onto a lower substrate as consistent with the Mori invention.

Mori does not appear to explicitly specify the spacers being fixedly attached to the lower substrate.

Matsuyama teaches and discloses a liquid crystal display element and production method wherein a plurality of spacers (Figure 6, spacers 7a) are adhered on an orientation controlling film (12) on an electrode (3) substrate (1) and then dried and baked to attach the spacers (7a) onto the film (12) and overall substrate (1) (Abstract and entire patent). The purpose of affixing the spacers onto a substrate is to prevent deviation in the electrode substrates and to promote a uniform cell gap (entire patent). Please note that the spacers may be adhered to either or both substrates (Column 5, Lines 36-46).

Therefore, it would have been obvious to one of ordinary skill in the art of liquid crystals at the time the invention was made to modify Mori in view of Matsuyama to prevent deviation of the substrates in the completed device and to ensure a uniform cell gap.

Mori furthermore teaches and discloses a spacer distribution density ranging from 100 to 600 particles per square millimeter (Column 6, Lines 34-56). Such a range overlaps with Applicant's claimed range of 100 to 300 mm^2. Mori teaches that if the spacer distribution density

is smaller than 100 particles per square millimeter, liquid crystal layer thickness cannot be made uniform (Id.). Mori also teaches that if the density exceeds 600 particles per square millimeter, too much light would pass through the spacers thus resulting in display roughness (Id.).

Therefore, it would have been obvious to one of ordinary skill in the art of liquid crystals at the time the invention was made to optimize a range of spacer distribution density to (1) ensure uniformity of the liquid crystal layer thickness and (2) to prevent display roughness both (1 and 2) as taught and disclosed by Mori.

Mori does not appear to explicitly specify that the spacers extend a distance ranging from 0.96d to 1.02d from the lower substrate, and a liquid crystal layer thickness in the region in which the spacers are disposed is represented by "d."

Niiya, on the other hand, teaches a liquid crystal display element and manufacturing method and teaches a range of (average) spacer thickness (x) with respect to cell gap thickness (d) of $d<x\leq 1.1d$ (entire patent). This range contributes to suppression of color shading while suppressing generation of bubbles in a vacuum region and prevents reduction in contrast (abstract, entire patent).

It would have been obvious to one of ordinary skill in the art of liquid crystals at the time the invention was made to modify Mori in view of Niiya to optimize upon spacer thickness with respect to substrate (liquid crystal) thickness for the suppression of color shading while suppressing generation of bubbles in a vacuum region and for the prevention of a reduction in contrast (abstract, entire patent).

Response to Arguments

Applicant's arguments with respect to claims 1, 5, 6 and 14 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeanne A. Di Grazio whose telephone number is (571)272-2289. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim, can be reached on (571)272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Art Unit 2871

JDG

DUNG T. NGUYEN
PRIMARY EXAMINER